

Investigation of the Dependence of Structural
Diffusion Coefficient on Temperature

SOV/20-125-6-16/61

structural diffusion; it further holds that $\alpha = 2kT/f$, where k denotes the Boltzmann constant, T - absolute temperature, and f - the factor of the quasielastical bond. In the present paper the temperature dependence of D is investigated for bismuth, and the attempt is made to give an analytical representation of $D = D(t)$. For this purpose the curves of the atomic distribution were constructed on the basis of the radiographical data obtained by employing a method developed by A. Ye. Glaubermann and V. P. Tsvetkov (Ref 3). The curves determined for bismuth were compared with the curves calculated by means of the above formulas for various lattices, after which that lattice was selected by the "washing out" of which the structure of the liquid bismuth could be described in the best manner. This is the case with a hexagonal tightly packed lattice. The first diagram shows some curves of the atomic distribution for bismuth. The second diagram shows the temperature of the coefficient of structural diffusion found in this way for bismuth and tin; it had been found by the author already at an earlier occasion (Ref 3). This temperature dependence is well described by the expression

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$$D = D_{\max} \exp \left[- \frac{Q}{R(T - T_{\text{melt}})} \right]$$

Here D_{\max} denotes a certain maximal coefficient of structural diffusion at high temperatures, Q - the "disintegration energy" of the liquid, T_{melt} - the absolute melting temperature of the metal concerned. The following values were found by means of analytical and graphical methods:

Element	$T_{\text{melt}}^{\circ\text{C}}$	D_{\max}	$Q \frac{\text{cal}}{\text{mol}}$	A, erg	$a, \text{\AA}$
Sn	505	0.014	36.0	$19.25 \cdot 10^{-12}$	4.30
Bi	544	0.010	12.6	$5.72 \cdot 10^{-12}$	4.70

Determination of the temperature dependence of D makes it possible to describe the course taken by the specific heat in liquids above melting point. The third diagram shows the curves for the theoretically determined dependence $c_p(T)$ for tin and

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bismuth; the curves correspond to the data determined by the author by means of the method of heating and cooling. There are 3 figures, 1 table, and 3 references, 2 of which are Soviet.

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AUTHOR: Tsvetkov, V.P.

TITLE: On the Structure of Liquid Metals

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Fizika,
1960, Nr 1, pp 145-154 (USSR)

ABSTRACT: Following Glauber (Ref 3), the radial distribution function $G(r)$ for a liquid is given by Eq (2), where n_s is the number of atoms on a sphere of radius r_s , D is the coefficient of structural diffusion (to allow for statistical scatter in equilibrium position of atoms in a liquid compared with a crystal lattice) and α denotes $2kT/f$ in which k is Boltzmann's constant, T absolute temperature and f is a factor associated with a quasi-elastic bond. Tsvetkov claims to be the first to investigate the effect of temperature on D . An X-ray technique using Cu radiation was employed to study the free surfaces of liquid Hg, Sn, Bi, Pb, Ga and Sb. The metal was held in a crucible 12 mm diameter (to give a flat surface), mostly under 10^{-5} mm Hg vacuum;

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Pb and Ga tended to oxidize slightly and so were only studied at low temperatures; volatilization of Sb was suppressed by the use of a hydrogen atmosphere. The crucible, and a small resistance furnace around it, lay within the X-ray camera. X-ray diagrams were measured with the MF-2 visual microphotometer and corrected for absorption and polarization. Positions of the first 3 intensity maxima are given in Table 1 for Hg, Sn, Bi, Pb, Ga and Sb in that order. Atomic distribution curves were obtained via Eq (3), in which R is distance between atoms, ρ_0 mean density of atoms of the liquid,

$$S = \frac{\sin \theta}{\lambda}, \quad i(s) = \frac{I_{eV}}{f^2} - 1$$

The integral was evaluated by Lashko's method (Ref 4). Models of various crystal lattices were prepared using small spheres and their radial atomic distribution functions evaluated using Eq (2). "Diffuse" curves

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obtained from these results, corresponding to liquids "derived" from such lattices, are shown in Fig 1:
1 - hex close packed; 2 - f.c.c; 3 - b.c.c;
4 - Hg lattice; 5 - Grey Sn lattice; 6 - white Sn lattice. Best fit for experimental curves from X-ray data was with 1, 2 and 3. It is pointed out that the first peak indicates the most probable distance between neighbours, and the area under it the coordination number k (which does not incidentally take into account empty sites). Table 2 gives some results determined for the same elements as Table 1: the 1st column of figures lists Goldschmidt atomic diameter, the 5th packing coefficient of solid, the 6th that for the liquid and the 9th the coordination number of the liquid. (The packing coefficient for the liquid is taken as $(k + 1)/13$ that of the crp solid, assuming a coordination number of 12 for the latter.) Though in most cases there is improved packing in the liquid, the value does not reach 74(%) which is characteristic of perfect close packing. Density of the

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liquid (σ) is calculated from Eq (4) in which M is atomic weight and P_H the weight of a hydrogen atom. Assuming a "diffuse" close packed structure for the liquids, f values (see Eq (2)) were derived on the basis of: (a) $D = 0$ at the freezing point and (b) best fit between theoretical and experimental distribution curves. Results are shown in Table 3 for elements in same order as in Table 1; f values ranged from 2200 g/sec² for Ga to 12000 for Sb. D values for other temperatures can then be calculated, again using best fit. Experimental (continuous lines) and theoretical (giving best fit) distribution curves are shown for various temperatures in Fig 2 to 5 for Hg, Sn, Bi, Pb and in Fig 6a for Ga and in Fig 6b for Sb. The temperature variation of D so obtained follows Eq (5):

$$D = D_{\max} \exp\left(\frac{Q}{R(T-T_m)}\right)$$

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D_{max} is some maximum value of D at high temperature, Q the energy for lattice relaxation and T_m the melting point ($^{\circ}K$). Values of D_{max} (0.014 to 0.005) and Q (36.0 to 5.6 cal/mole) are given in Table 4 for Sn, Bi and Hg, both increasing with T_m . Attempts were then made to calculate liquid specific heats. Eq (9) was derived via Eq (6) to (8) in which U is an interaction potential energy, A a constant (the dissociation energy of a diatomic "molecule" of metal), a the equilibrium interatomic distance in this "molecule", γ the scale on which r and a are measured, \bar{U} the mean interaction energy, N the number of atoms in the liquid. C_p was calculated from C_v and was compared with experimental values obtained from cooling curves. The results are shown in Fig 8 for Sn (Curve 1) and Pb (Curve 2); points are experimental, curves are calculated. The excellent agreement obtained with A values (Eq (9)) given in Table 5 (1st column of figures in erg, 2nd column in eV) for Sn and Bi (0.78 and 3.57 eV respectively) is evidence for the correctness of the theory employed. In

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conclusion it is stated that similar distributions and behaviour are found for other metals; data from Ref 5 are used to construct the distribution curves of Fig 9 for 1-In 2-Al 3-Zn 4-Cd. Broken curves are theoretical with f values of, respectively, 2900, 5200, 3900 and 8300. These liquid metals accordingly also have a close packed structure. Experiments with Na and K, however, showed that they are not close packed. There are 9 figures, 5 tables and 5 references, 2 of which are Soviet, 2 English and 1 German. ✓

ASSOCIATION: Voroshilovskiy gornometallurgicheskiy institut
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SUBMITTED: March 2, 1959

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KRAVTSOVA, N.F.; TSVETKOV, V.P. [TSvietkov, V.P.]

Experimental study of the atomic scattering factor of nickel. Ukr. fiz.
zhur. 7 no.12:1355-1362 D '62. (MIRA 15:12)

1. Komunarskiy gorno-metallurgicheskiy institut.
(Nickel) (Scattering (Physics))

ACCESSION NO 494 24 10

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1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250 251 252 253 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270 271 272 273 274 275 276 277 278 279 280 281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 296 297 298 299 300 301 302 303 304 305 306 307 308 309 310 311 312 313 314 315 316 317 318 319 320 321 322 323 324 325 326 327 328 329 330 331 332 333 334 335 336 337 338 339 340 341 342 343 344 345 346 347 348 349 350 351 352 353 354 355 356 357 358 359 360 361 362 363 364 365 366 367 368 369 370 371 372 373 374 375 376 377 378 379 380 381 382 383 384 385 386 387 388 389 390 391 392 393 394 395 396 397 398 399 400 401 402 403 404 405 406 407 408 409 410 411 412 413 414 415 416 417 418 419 420 421 422 423 424 425 426 427 428 429 430 431 432 433 434 435 436 437 438 439 440 441 442 443 444 445 446 447 448 449 450 451 452 453 454 455 456 457 458 459 460 461 462 463 464 465 466 467 468 469 470 471 472 473 474 475 476 477 478 479 480 481 482 483 484 485 486 487 488 489 490 491 492 493 494 495 496 497 498 499 500 501 502 503 504 505 506 507 508 509 510 511 512 513 514 515 516 517 518 519 520 521 522 523 524 525 526 527 528 529 530 531 532 533 534 535 536 537 538 539 540 541 542 543 544 545 546 547 548 549 550 551 552 553 554 555 556 557 558 559 560 561 562 563 564 565 566 567 568 569 570 571 572 573 574 575 576 577 578 579 580 581 582 583 584 585 586 587 588 589 590 591 592 593 594 595 596 597 598 599 600 601 602 603 604 605 606 607 608 609 610 611 612 613 614 615 616 617 618 619 620 621 622 623 624 625 626 627 628 629 630 631 632 633 634 635 636 637 638 639 640 641 642 643 644 645 646 647 648 649 650 651 652 653 654 655 656 657 658 659 660 661 662 663 664 665 666 667 668 669 670 671 672 673 674 675 676 677 678 679 680 681 682 683 684 685 686 687 688 689 690 691 692 693 694 695 696 697 698 699 700 701 702 703 704 705 706 707 708 709 710 711 712 713 714 715 716 717 718 719 720 721 722 723 724 725 726 727 728 729 730 731 732 733 734 735 736 737 738 739 740 741 742 743 744 745 746 747 748 749 750 751 752 753 754 755 756 757 758 759 760 761 762 763 764 765 766 767 768 769 770 771 772 773 774 775 776 777 778 779 780 781 782 783 784 785 786 787 788 789 790 791 792 793 794 795 796 797 798 799 800 801 802 803 804 805 806 807 808 809 810 811 812 813 814 815 816 817 818 819 820 821 822 823 824 825 826 827 828 829 830 831 832 833 834 835 836 837 838 839 840 841 842 843 844 845 846 847 848 849 850 851 852 853 854 855 856 857 858 859 860 861 862 863 864 865 866 867 868 869 870 871 872 873 874 875 876 877 878 879 880 881 882 883 884 885 886 887 888 889 890 891 892 893 894 895 896 897 898 899 900 901 902 903 904 905 906 907 908 909 910 911 912 913 914 915 916 917 918 919 920 921 922 923 924 925 926 927 928 929 930 931 932 933 934 935 936 937 938 939 940 941 942 943 944 945 946 947 948 949 950 951 952 953 954 955 956 957 958 959 960 961 962 963 964 965 966 967 968 969 970 971 972 973 974 975 976 977 978 979 980 981 982 983 984 985 986 987 988 989 990 991 992 993 994 995 996 997 998 999 1000 1001 1002 1003 1004 1005 1006 1007 1008 1009 1010 1011 1012 1013 1014 1015 1016 1017 1018 1019 1020 1021 1022 1023 1024 1025 1026 1027 1028 1029 1030 1031 1032 1033 1034 1035 1036 1037 1038 1039 1040 1

1. *Chlorophyll a* and *Chlorophyll b* were determined by the method of Lichtenthaler and Whistler (1972).

^a $\chi^2 = 1.0$, $df = 1$, $p = .32$. ^b $\chi^2 = 1.0$, $df = 1$, $p = .32$. ^c $\chi^2 = 1.0$, $df = 1$, $p = .32$. ^d $\chi^2 = 1.0$, $df = 1$, $p = .32$. ^e $\chi^2 = 1.0$, $df = 1$, $p = .32$. ^f $\chi^2 = 1.0$, $df = 1$, $p = .32$. ^g $\chi^2 = 1.0$, $df = 1$, $p = .32$. ^h $\chi^2 = 1.0$, $df = 1$, $p = .32$. ⁱ $\chi^2 = 1.0$, $df = 1$, $p = .32$. ^j $\chi^2 = 1.0$, $df = 1$, $p = .32$. ^k $\chi^2 = 1.0$, $df = 1$, $p = .32$. ^l $\chi^2 = 1.0$, $df = 1$, $p = .32$. ^m $\chi^2 = 1.0$, $df = 1$, $p = .32$. ⁿ $\chi^2 = 1.0$, $df = 1$, $p = .32$. ^o $\chi^2 = 1.0$, $df = 1$, $p = .32$. ^p $\chi^2 = 1.0$, $df = 1$, $p = .32$. ^q $\chi^2 = 1.0$, $df = 1$, $p = .32$. ^r $\chi^2 = 1.0$, $df = 1$, $p = .32$. ^s $\chi^2 = 1.0$, $df = 1$, $p = .32$. ^t $\chi^2 = 1.0$, $df = 1$, $p = .32$. ^u $\chi^2 = 1.0$, $df = 1$, $p = .32$. ^v $\chi^2 = 1.0$, $df = 1$, $p = .32$. ^w $\chi^2 = 1.0$, $df = 1$, $p = .32$. ^x $\chi^2 = 1.0$, $df = 1$, $p = .32$. ^y $\chi^2 = 1.0$, $df = 1$, $p = .32$. ^z $\chi^2 = 1.0$, $df = 1$, $p = .32$.

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GLAZKO, V.G.; TSVETKOV, V.P.

Phase analysis of iron ore mixtures for the magnetic
content. Stal' 24 no.8:684-685 Ag '64. (MIRA 1964)

1. Kommunarakiy gorno-metallurgicheskiy institut.

TSVETKOV, Vladimir Petrovich, dots.; KLESHOV, Boris Aleksandrovich;
FOMKIN, Nikolay Yefimovich, kand. tekhn. nauk; ANOROV,
Sergey Nikolayevich, st. nauchn. sotr.; PERFILOV, I.F.,
inzh., red.

[Pressure-water conduits of reinforced concrete pipes;
practices of the "Kalininspetsstroi" Trust and the All-
Union Research Institute for Water Supply, Sewer Systems,
Hydraulic Engineering Structures, and Hydrogeological
Engineering (VODGEO)] Naporny vodovod iz zheleznodorozh-
nykh trub; opyt tresta "Kalininspetsstroi" i VNII vodo-
snabzheniya, kanalizatsii, gidrotekhnicheskikh sooruzhenii
i inzhenernoi gidrogeologii (VODGEO). Moskva, Stroiizdat,
1964. 26 p. (MIRA 17:12)

1. Moscow. Nauchno-issledovatel'skiy institut organizatsii,
mekhanizatsii i tekhnicheskoy pomoshchi stroitel'stvu.
2. Zaveduyushchiy kafedroy Kalininskogo torfyanogo instituta
(for Tsvetkov). 3. Glavnyy inzhener tresta "Kalininspetsstroy"
(for Kleshov). 4. Vsesoyuznyy nauchno-issledovatel'skiy in-
stitut vodosnabzheniya, kanalizatsii, gidrotekhnicheskikh so-
oruzheniy i inzhenernoy gidrogeologii (for Anorov).

Tsvetkov, V.S.

DOMBRACHEVA, Ye.F.; KOZLOV, A.M.; KRICHEVSKIY, M.Ye.; LAPITSKIY, M.A.;
LISTOVSKIY, N.D.; LUKANOV, M.A.; MANUKOV, N.P.; MICHURINA, V.V.;
POLYACHENKO, A.V.; TIMOFYEV, N.A.; TSVETKOV, V.S.; CHISTYAKOV,
V.D.; KOPEYKIN, P.A., inzh., red.; KRYUKOV, V.L., red.; KOBLYAKOV,
L.M., red.; ZUBRILINA, Ye.P., tekhn. red.

[Practices in tractor repair] Opyt remonta traktorov. Moskva, Gos.
izd-vo sel'khoz. lit-ry, 1958. 301 p. (MIRA 11:7)
(Tractors—Maintenance and repair)

KAPLUNOV, A.I.; TSVETKOV, V.S.

SKL-62 seismic logging laboratory. Mash. i neft. obor. no.10:
5-13 '63. (MIRA 17:4)

1. Zavod "Neftepribor".

TSVETKOV, Vasilii Sergeyevich; SAZIKOV, M.I., red.

[Repairing the PD-10 starting engine] Remont puskovogo
dvigatel'ia PD-10M. Moskva, Biuro tekhn. informatsii.
1963. 22 p. (MIRA 17:9)

GORDINA, R.V., LAZURENKO, I.S., REMOVA, T.N., SILAKOVA, A.V., TSVETKOV, V.S.

Reactivity induced by whooping cough and whooping cough-diphtheria vaccines. Zhur.mikrobiol.epid. i immun. 29 no.6:21-26 Je '58
(MIRA 11:7)

1. Iz Instituta epidemiologii i mikrobiologii imeni Gamalei
AMN SSSR i Instituta pediatrii AMN SSSR.

(WHOOPING COUGH, immunology,

whooping cough & whooping cough-diphtheria vaccines,
eff. (Rus))

(DIPHTHERIA, immunology,

whooping cough-diphtheria vaccine, eff. (Rus))

(VACCINES AND VACCINATION,

whooping cough & whooping cough-diphtheria vaccines
(Rus))

ABELEV, G.I.; TSVETKOV, V.S.

Isolation of specific antigens of transplanted mouse hepatoma by
means of an immunofiltration method. Vop. onk. 6 no.6:62-72 Je
'60. (MIRA 14:3)

(TUMORS--TRANSPLANTATION)

(ANTIGENS AND ANTIBODIES)

ABELEV, D.I.; AVENIROVA, Z.A.; TSVETKOV, V.S.

Elution and purification of an organ specific antigen of the liver.
Vop. onk. 6 no.7:43-49 Je '60. (MIRA 14:4)
(TUMORS) (ANTIGENS AND ANTIBODIES)

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"Isolation of the Specific Antigens of Neoplastic and Normal Tissues by
Methods of Preparatory Immuno-electrophoresis and Immunofiltration."

Report presented at the 5th Int'l. Biochemistry Congress,
Moscow, 10-16 Aug. 1961

GUSEV, A.I.; TSVETKOV, V.S.

Technic of preparing microprecipitation in agar. Lab. dolo 7 no.2:
43-45 F '61. (MIRA 14:1)

1. Otdel immunologii i onkologii (zav. - prof. L.A.Zil'ber)
Instituta epidemiologii i mikrobiologii imeni N.F.Gamalei AMN SSSR,
Moskva.

(ANTIGENS AND ANTIBODIES)

ARTEM'YEV, Yu.N., kand. tekhn. nauk; ASTVATSATUROV, G.G., inzh.;
 BARABANOV, V.Ye., inzh.; BARYKOV, G.A., inzh.; BISNOVATYY, S.I.,
 inzh.; GALAYEVA, L.M., inzh.; GAL'PERIN, A.S., kand. tekhn. nauk;
 GAL'CHENKO, I.I., inzh.; GONCHAR, I.S., kand. tekhn. nauk;
 DEGTYAREV, I.L., kand. tekhn. nauk; DYADYUSHKO, V.P., inzh.;
 YERMAKOV, I.N., inzh.; ZHOTKEVICH, T.S., inzh.; ZUSMANOVICH, G.G.,
 inzh.; KAZAKOV, V.K., inzh.; KOZLOV, A.M., inzh.; KOROLEV, N.A.,
 inzh.; KRIVENKO, P.M., kand. tekhn. nauk; LAPITSKIY, M.A., inzh.;
 LEBEDEV, K.S., inzh.; LIBERMAN, A.R., inzh.; LIVSHITS, L.G., kand.
 tekhn. nauk; LOSEV, V.N., inzh.; LUKANOV, M.A., inzh.; LYUBCHENKO,
 A.M., inzh.; MAMEDOV, A.M., kand. tekhn. nauk; MATVEYEV, V.A.,
 inzh.; ORANSKIY, N.N., inzh.; POLYACHENKO, A.V., kand. tekhn. nauk;
 POFOV, V.P., kand. tekhn. nauk; PUSTOVALOV, I.I., inzh.;
 PYTCHENKO, P.I., inzh.; PYATETSKIY, B.G., inzh.; RABOCHIY, L.G.,
 kand. tekhn. nauk; ROL'BIN, Ye.M., inzh.; SELIVANOV, A.I., doktor
 tekhn. nauk; SEMENOV, V.M., inzh.; SKOROKHOD, I.I., inzh.; SLABODCHIKOV,
 V.I., inzh.; STORCHAK, I.M., inzh.; STRADYMOV, F.Ya., kand. tekhn.
 nauk; SUKHINA, N.V., inzh.; TIMOFEYEV, N.D., inzh.; FEDOSOV, I.M.,
 kand. tekhn. nauk; FILATOV, A.G., inzh.; KHODOV, L.P., inzh.;
 KHROMITSKIY, P.A., inzh.; TSVETKOV, V.S., inzh.; TSEYTLIN, B.Ye.,
 inzh.; SHARAGIN, A.M., inzh.; CHISTYAKOV, V.D., inzh.; BUD'KO, V.A.,
 red.; PESTRYAKOV, A.I., red.; GUREVICH, M.M., tekhn. red.

(Continued on next card)

ARTEM'YEV, Yu.N.--- (continued) Card 2.

[Manual on the repair of machinery and tractors] Spravochnik po
remontu mashinno-traktornogo parka. Pod red. A.I.Selivanova.
Moskva, Sel'khozizdat. Vols.1-2. 1962. (MIRA 15:6)
(Agricultural machinery--Maintenance and repair)
(Tractors--Maintenance and repair)

TSVETKOV, V.S.

Some problems in the medicolegal examination of injuries in
corpses recovered from mountain rivers; preliminary report.
Sud.-med. eksper. 7 no.18-12 Ja-Me*64 (MIRA 17:4)

1. Stavropol'skoye krayevoye byuro sudebnoy meditsinskoy eksper-
tizy (nachal'nik - prof. A.S. Litvak).

TSVETKOV, V.S.

Avulsion of the leg in a motorcycle accident. Orthoped. 1964, pt.
7 no.3:46 21-3 164. (MIL 1964)

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Study of the antigen structure of tumors in man. Report No.2:
Purification of specific immune sera to stomach cancer in man.
Vop. onk. 10 no.3:116-118 '64. (MIRA 17:8)

1. Iz otdela immunologii i onkologii (zav. -- prof. L.A. Zil'ber)
Institut epidemiologii i mikrobiologii imeni Gamalei (dir. --
prof. P.A. Vershilova). Adres avtorov: Moskva, D-182, Malaya
Shehukinskaya, 13, Institut epidemiologii i mikrobiologii imeni
Gamalei

LYUDOGOVSKAYA, L.A.; TSVETKOV, V.S.; KIRYUKHIN, V.P.

Antigen structure of tumors in man. Report No.3: Comparative
analysis of stomach cancer tissue. Vop. onk. 10 no.3:18-22 '64.
(MIRA 17:8)

1. Iz otdela immunologii i onkologii (zav. - prof. L.A. Zil'ber)
Instituta epidemiologii i mikrobiologii imeni N.F. Gamalei
(dir. - prof. P.A. Vershilova) i patologoanatomicheskogo otdela
(zav. - S.V. Kagramanov) 62-y Gorodskoy bol'nitsy (glavnyy
vrach - V.D. Margolin). Adres avtorov: Moskva, D-182, Malaya
Shchukinskaya 13, Institut epidemiologii i mikrobiologii imeni
Gamalei, otdel immunologii i onkologii.

TSVETKOV, V.S.; AVENIROVA, Z.A.; LYUDOGOVSKAYA, L.A.

Antigenic structure of tumors in man. Report no.4: Fractioning of extracts from cancer of the human stomach by the method of preparative electrophoresis. Vop. onk. 10 no.10:64-67 '64. (MIRA 18:8)

1. Iz laboratorii kletochnykh antigenov (zav. - G.I.Abelev) otdela immunologii i onkologii (zav. - prof. L.A.Zil'ber) Instituta epidemiologii i mikrobiologii imeni N.F.Gamalei (direktor - prof. P.A.Vershilova). Adresy avtorov: Leningrad, Institut onkologii AMN SSSR (for Avenirova); Malaya Shchukinskaya 13, Institut epidemiologii i mikrobiologii im. N.F.Gamalei, Otdel immunologii i onkologii (for Tsvetkov, Lyudogovskaya).

1. L2079-66 ENT(1) CW

ACC NR: AP6005350

SOURCE CODE: UR/0413/66/000/001/0092/0093

AUTHORS: Kaplunov, A. I.; Veksler, B. Ye.; Malinskiy, S. A.; Tsvetkov, V. S. 36
3

ORG: none

TITLE: Multichannel device for seismic logging of bores. Class 42, No. 177642
[announced by "Neftepribor" Factory (Zavod "Neftepribor")]

SOURCE: Izobreteniya, promyshlennyye obraztsy, tovarnyye znaki, no. 1, 1966, 92-93

TOPIC TAGS: seismologic instrument, electronic circuit

ABSTRACT: This Author Certificate presents a multichannel device for seismic logging of bores. The device contains seismic detectors, amplifiers, carrier frequency oscillators, electric filters, modulators, demodulators, a magnetic recorder, and a power supply. To broaden the dynamic range of the received signals, electrical sections are connected in each channel between the modulator tube and the communication line networks (see Fig. 1). The sections are made of crystal diodes (connected in opposition) and resistors and are connected to the programming

Cord 1/2

UDC: 550.340.84

I. L2079-66 ENT(1) CW

ACC NR: AP6005350

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Card 1/2

UDC: 550.340.84

1 12070-66

ACC NR: AP6005350

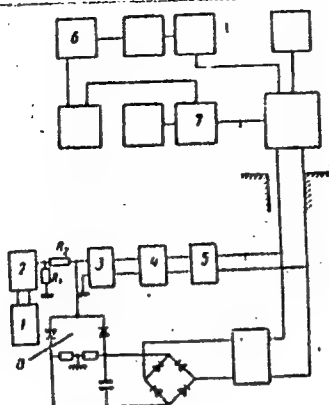


Fig. 1. 1 - seismic detector;
2 - amplifier (modulator);
3 - amplifier; 4 - carrier
frequency oscillator; 5 - filter;
6 - demodulator; 7 - recorder;
8 - electrical sections

device. Orig. art. has: 1 diagram.

SUB CODE: 08,09/ SUBM DATE: 19Nov64

Card 2/2

L 3390-66 EWT(1)/EWA(j)/EWA(b)-2 JK

ACCESSION NR: AP5021651

UR/0218/65/030/004/0739/0742

AUTHOR: ^{44, 55}Shemanova, G. F.; ^{44, 55}Vlasova, Ye. V.; ^{55, 44}Tsvetkov, V. S.

TITLE: Isolation and properties of purified lecithinase C from Cl. perfringens.

SOURCE: Biokhimiya, v. 30, no. 4, 1965, 739-742

TOPIC TAGS: toxicology, ammonium sulfate, ⁴⁴fungus, biologic antigen

ABSTRACT: The first stage of purification of lecithinase C was carried out by saturation of the mother liquor of the culture with ammonium sulfate. The albumen film formed was removed, centrifuged, and dialyzed for two days. The toxin was concentrated further by precipitation with acid at the isoelectric point under salting out conditions. The yield of lecithinase was approximately 70% with an increase in specific activity of 2-3 times. In addition to the specific activity, the degree of purification was estimated from the decrease in the number of antigen fractions determined by microprecipitation in agar. Subsequent precipitation of the preparation with 25% ammonium sulfate freed the lecithinase from a considerable part of the corresponding antigens. After purification of the lecithinase by

Card 1/2

L 3390-66

ACCESSION NR: AP5021651

3

sorption of the inert albumens from a 0.05 molar acetate buffer solution (pH 5.6) on DEAE cellulose, the lecithinase contains only one antigen which appears to be an alkali proteinase. The activity of the lecithinase was found to be 12,000 - 15,000 lethal units per mg, determined on white mice. The preparation of lecithinase is serologically homogeneous and is also homogeneous under ultracentrifuging. Orig. art. has: 2 figures

ASSOCIATION: Otdel ranevykh infektsiy, Institut epidemiologii i microbiologii im N. F. Gamalei Akademii meditsinskikh nauk SSSR, Moscow (Department of Wound Infections, Institute of Epidemiology and Microbiology, Academy of Medical Sciences of the SSSR)

SUBMITTED: 03Oct64

66,44
ENCL: 00

SUB CODE: LS

NR REF SOV: 007

OTHER: 005

Card 2/2 *md*

KUCHINSKAYA, N.Ye.; KUL'BERG, A.Ya.; TSVETKOV, V.S.

Immunochemical analysis of the products of the splitting of bovine
 γ -globulin with papain. Biokhimiia 30 no.5:1065-1070 3-0 '65.
(MIRA 18:10)

1. Institut epidemiologii i mikrobiologii imeni N.F.Gamalei
AMN SSSR, Moskva.

L 56491-65 EWT(m)/EWP(t)/EWP(b) Feb DIAAP/IJP(c) JD/JG

ACCESSION NR: AP5017799

UR/0186/65/000/011/0027/0027
546.78.05:539.16:541.183.12

19
18
B

AUTHOR: Andreyeva, O. I.; Tsvetkov, V. S.

TITLE: A method for extracting tungsten-181 from radioactive solutions. Class 12,
No. 171395 19

SOURCE: Byulleten' izobreteniy i tovarnykh znakov, no. 11, 1965, 17

TOPIC TAGS: radioactive isotope, tungsten, metal extraction

ABSTRACT: This Author's Certificate introduces: 1. A method for extracting tungsten-181 from radioactive solutions produced by dissolving an irradiated target. The tungsten is separated without a carrier by feeding the solution to an ion exchange column with an anion-exchange resin, e.g. EDE-10p in the form of PO_4 . The resin is then washed and the tungsten-181 is extracted. 2. A modification of this method in which washing is done with water and a 0.3-0.5 n solution of ammonia. 3. A modification of this method in which a saturated solution of ammonium carbonate is used for tungsten extraction.

27

Card 1/2

L 56491-65

ACCESSION NR: AP5017799

ASSOCIATION: Gosudarstvennyy institut prikladnoy khimii (State Institute of Applied Chemistry)

SUBMITTED: 24Jun64

ENCL: 00

SUB CODE: GC, NP

NO REF SOV: 000

OTHER: 000

2/1
Card

2/2

TSYETKOV, Y.T., prof., doktor tekhn.nauk; KRUSHEDOL'SKIY, G.I., kand.tekhn.
nauk, otv.red.; TRETYAKOVA, A.N., red.; TROPIMENKO, A.S., tekhn.
red.

[Internal combustion engines; design and construction] Dvigatel'
i vnutrennego sgoraniya; konstruktatsiya i raschet. Izd.2.
Khar'kov, Izd-vo Khar'kovskogo gos.univ. im.A.M.Gor'kogo, 1960.
656 p.

(MIRA 14:5)

(Gas and oil engines—Design and construction)

TSVETKOV, V.T., professor, doktor tekhnicheskikh nauk; GLAGOLEV, A.Ye., professor,
doktor tekhnicheskikh nauk, redaktor.

[Internal combustion engines] Dvigateli vnutrennego sgoraniia; konstruktsiia i raschet. Kiev, Gos. nauchno-tekhn. izd-vo mashinostroit. i sudostroit. lit-ry [Ukrainskoe otd-nie] 1953. 530 p. (MLA 7:1)
(Gas and oil engines)

ISVETROV, V. T.

Internal combustion engines; manual Kiev, Gos. nauchno-tekhn. ezd-vo mashinostroit. i
sudostroit. lit-ry Ukrainskoe otd-nie 1953. 530 p. (54-24399)

TJ785.T8

TSVETKOV, V.T.

Dvigateli vnutrennego sgoraniia; konstruktsiia i raschet. Dopushcheno v kachestve ucheb. posobiia dlia vtuzov. Kiev, Gos. nauchnotekhn. izd-vo mashinostroitel'noi i sudostroitel'noi lit-ry, 1953. 530 p., illus., tables, diagrs.

Bibliography at end of each chapter.

Title tr.: Internal combustion engines; design and construction. Approved as a textbook for schools of advanced technical studies.

TJ85. T8

So: Aeronautical Sciences and Aviation in the Soviet Union, Library of Congress, 1955.

"APPROVED FOR RELEASE: 04/03/2001

CIA-RDP86-00513R001757220012-4

TSVK+KOV VT

APPROVED FOR RELEASE: 04/03/2001

CIA-RDP86-00513R001757220012-4"

TSVETKOV, V.V. Cand. Agricult. Sci.

Dissertation: "Mobility of Water in Black Soils and its Influence on the Effectiveness of Mellowing, as a Measure for Water Conservation in Soil."
All-Union Inst of Fertilizers, Agricultural Engineering and Soil Science
imeni K.K. Gedroyets, 18 Feb 47.

SO: Vechernyaya Moskva, Feb, 1947 (Project #17836)

GENKIN, K.I., doktor tekhn. nauk; TSVETKOV, V.V., inzh.

Discussing V.P. Alekseev's article "Quality factor of the working
performance of an internal combustion engine."

Energomashinostroenie 7 no.2:40-41 P '61.

(MIRA 16:7)

(Gas and oil engines--Testing)

TSVETKOV, V.V., inzh.

Method of comprehensive parameters. Energomashinostroenie
7 no.9:46-47 8 '61. (MIRA 14:9)
(Diesel engines)

TSVETKOV, V.V.

Study of the performance of a fuel system operating on different fuels. Trakt.1 sel'khoz mash. no.8:10-12 Ag '62. (MIRA 15:8)

1. Khar'kovskiy zavod transportnogo mashinostroyeniya.
(Tractors--Fuel systems)

S/114/63/000/003/004/005
E194/E455

AUTHOR: Tsvetkov, V.V., Engineer

TITLE: Operation of a swirl-chamber diesel engine on mixtures of diesel fuel and gasoline

PERIODICAL: Energomashinostroyeniye, no.3, 1963, 20-22

TEXT: The work was carried out on a diesel engine type Д-35 (D-35) using mixtures of winter diesel fuel to standard ГОСТ-305-42 (GOST-305-42) and gasoline А-74 to standard ГОСТ-2084-51 (GOST-2084-51). The engine was tested first on diesel fuel and then on various mixtures. The fuel temperature at the fuel pump inlet was maintained constant at 40°C. Indicator diagrams were taken in the main and swirl chambers. On adding 25% gasoline to the diesel fuel there was considerable loss of power which was traced to vapor formation in the inlet section of the fuel pump. This was overcome by returning some fuel from the top of the fine filter to the fuel tank, the remainder being delivered to the main fuel-circulation pump. The engine then ran satisfactorily on fuel with 25% gasoline. When the gasoline ratio was increased to 50% there was some 8 to 12% loss of engine power, more than could be accounted for by change in gravity of

Card 1/3

Operation of a swirl-chamber ...

S/114/63/000/003/004/005
E194/E455

fuel. The reason was found to be impaired injection, resulting from vapor formation during filling of the fuel pump. The trouble was overcome by raising from 0.7 to 3.8 kg/cm² the pressure in the inlet section of the metering pump (and delivered by the circulation pump). The metering pump then fills more rapidly. With this modification the engine ran as well on mixed fuel as on diesel fuel alone. When the gasoline content was raised to 75% the engine power again dropped by 11 to 15% with increased fuel consumption, particularly at rated speed and load. A kink appeared in the expansion line of the indicator diagram, which was particularly marked at high load and low speed. The effect was evidently due to retarded combustion of fuel in the swirl chamber and more intensive combustion in the main chamber with the piston near top dead centre. The pressure rise in the main chamber returned some of the gas to the swirl chamber, resulting in impaired combustion. Injection was also impaired because the mixed fuel leaked more readily through clearances in the injection pump. This can be overcome by adding diesel engine lubricant to the fuel mixture, to the extent of 3 to 5% by weight, but a better Card 2/3

Operation of a swirl-chamber ...

S/114/63/000/003/004/005
E194/E455

method is to improve lubrication of the pump plungers by simple modifications which are described. The amount of lubricant required for the pump was 8 g/h for a four-plunger pump, whilst the addition of 5% oil to the fuel required 350 g/h. When these various measures were taken the engine ran satisfactorily on fuel containing 75% gasoline. There was some extra pressure rise in the combustion chamber, which was not of practical importance. It is considered that mixed fuel could also be used on other types of Soviet diesel engines. There are 5 figures.

Card 3/3

SOURCE CODE: UR/0386/66/004/011/0449/0453

ACC NR: AP7001339

AUTHOR: Kurnosov, V. D.; Magalyas, V. I.; Pleshkov, A. A.; Rivlin, L. A.; Trukhan, V. G.; Tsvetkov, V. V.

ORG: none

TITLE: Self modulation of emission from an injection semiconductor laser

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki. Pis'ma v redaktsiyu. Prilozheniya, v. 4, no. 11, 1966, 449-453

TOPIC TAGS: semiconductor laser, laser emission, laser pumping, light modulation, pn junction, gallium arsenide

ABSTRACT: The authors show first, by analyzing the kinetic equations for the power of an injection-type laser, that self modulation of such a laser is possible if it is assumed that the injection laser has the same self-oscillating properties as an optically pumped one. They then report on the time structure of a GaAs laser emission, observed experimentally by means of an electron-optical converter (EOC) (M. N. Bustlov, Uspekhi nauchnoi fotografii no. 6, 76, 1959) with a time-scanned image (sweep duration ~2 nsec). The GaAs diode with a p-n junction produced by diffusion was excited by single injection-current pulses of 1 - 5 amp and 600 nsec duration, synchronized with the pulsed supply to the EOC. The image of the glowing active layer of the diode was projected by microscope objectives from a vacuum liquid-nitrogen cryostat onto the photocathode of the EOC. The experiments showed clearly the emis-

Card 1/2

ACC NR: AP701339

sion self-modulation (spikes), whose period decreased with increasing injection current (from 0.35 nsec at 2 amp to 0.17 nsec at 4.3 amp). There was no self modulation of the spontaneous emission below threshold. Self modulation periods as low as 0.05 nsec were observed in different diodes with threefold excess over threshold. The synchronous self modulation was accompanied by non-synchronous modulation at individual points, probably due to differences in local thresholds and the inhomogeneous distribution of the injection-current density. The measurement results agree with the calculations in order of magnitude, but a more accurate comparison calls for knowledge of the mode content of the emission, since the calculations were made in the single-mode approximation. The authors thank M. M. Bustlov for consultation and supplying the EOC tubes. Orig. art. has: 1 figure and 3 formulas.

SUB CODE: 20/ SUBM DATE: 29Jul66/ ORIG REF: 002/ OTH REF: 003

Card 2/2

L 14628-66 FBD/EWT(1)/EWP(e)/EWT(m)/EEC(k)-2/T/EWP(k)/EWP(1)/EWA(h)
 ACC NR: AP6002709 SCIB/IJP(c) SOURCE CODE: UR/0056/65/049/006/1718/1722
 VIG/WH/GG/WH

AUTHOR: Borodulin, V. I.; Yermakova, N. A.; Rivlin, L. A.; Tsvetkov, V. V.;
 Shil'dyayev, V. S.

ORG: none

TITLE: Nonlinear negative absorption of resonance light in ruby and neodymium glass

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 49, no. 6, 1965,
 1718-1722

TOPIC TAGS: ruby laser, solid state laser, neodymium glass, laser pulsation,
 resonance absorption, light absorption

ABSTRACT: The purpose of the experiment was to obtain a quantitative comparison of the calculated drop in the negative light absorption induced in a laser by a resonance signal, and the experimental drop observed in ruby and neodymium glass. The materials tested were a ruby sample with 90° orientation, 0.05% Cr ions, and bleached end surfaces, and glass with about 4% neodymium ions. The pumping was done with high-intensity flash lamps in both cases, and the input and output light pulses were recorded with photocells and an oscilloscope.

Card 1/2

L 14628-66
ACC NR: AF6002709

The results show that propagation of a monopulse from a laser and the distortion of the pulse waveform during the propagation cause negative absorption of the resonance light in ruby single crystals as well as in neodymium glass, and the degree of nonlinearity of the negative absorption and the distortion of the pulse waveform can be readily determined from the deviation of the oscillogram from a straight line. The agreement between theory and experiment is regarded as satisfactory. "The authors are grateful to N. Al'tshil', Yu. Romanov, V. Trukhan, and A. Uits for participating in the experiment." Orig. art. has: 5 figures and 2 formulas. [02]

SUB CODE: 20/ SUBM DATE: 29Jun65/ ORIG REF: 004/ OTH REF: 005
ATD PRESS: 4/98

Card 2/2 SC

TSVETKOV, YA.N.

Esters of cyclopentadienyl-, indenyl-1-, and fluorenyl-9-phosphorinous acids.

Khimiya i Primeneniye Fosfororganicheskikh Soedineniy (Chemistry and application of organophosphorus compounds) A. Ya. Averbach, ed. Publ. by Kazan Affil. Acad. Sci. USSR, Moscow 1962. 432 pp.

Collection of complete papers presented at the 1962 Kazan Conference on Chemistry of Organophosphorus Compounds.

ACCESSION NR: AP4021242

8/0286/64/000/004/0057/0057

AUTHOR: Tsvetkov, Ye. A.

TITLE: Drive for a servocompensator control mechanism. Class 62, No. 160658

SOURCE: Byul. izobret. i tovarn, znakov, no. 4, 1964, 57

TOPIC TAGS: servocompensator, servocompensator control, servocompensator control drive, control surface drive, a rudder drive, elevator drive

ABSTRACT: This authorship certificate introduces a drive for a servocompensator control mechanism (see Enclosure). The drive consists either of a hinge and lever system which contains a rocker, double-armed lever, and rod or of a rotating shaft, hinged rod, and levers. In order to improve the aerodynamic control surfaces, the device is mounted on the interior of the control element.

ASSOCIATION: none

Card 1/1

L 31272-66 EWT(m)/EWP(j)/T RM

ACC NR: AP6022796

SOURCE CODE: UR/0079/66/036/002/0274/0282

AUTHOR: Gilyarov, V. A.; Tsvetkov, Ye. E.; Kabachnik, M. I.

ORG: Institute of Heteroorganic Compounds, AN SSSR (Institut elementoorganicheskikh soyedineniy AN SSSR)

TITLE: Imides of phosphorus acids, VIII. N-acylimidophosphates and -phosphinates and N-acylamidophosphates and -phosphinates

SOURCE: Zhurnal obshchey khimii, v. 36, no. 2, 1966, 274-282

TOPIC TAGS: organic phosphorus compound, chemical synthesis, dissociation constant, organic amide, molecular structure, IR spectrum, azide, imide

ABSTRACT: A series of new azidophosphates and azidophosphinates was produced by the reaction of chlorophosphates and chlorophosphinates with triethylammonium azide. N-Acylimidophosphates and -phosphinates were synthesized by reaction of acyl azides with esters of phosphorous and phosphinous acids, and then dealkylated with hydrogen chloride to the corresponding N-acylamidophosphates and -phosphinates. The concentration dissociation constants of a number of N-acylamidophosphates were determined, and it was concluded on the basis of the Bronsted rule that these substances possess an amide, not an imidol structure. Infrared spectra of the products were also studied and will be published separately. Orig. art. has: 1 figure and 4 tables. [JPRS]

SUB CODE: 07 / SUBM DATE: 10Nov64 / ORIG REF: 014 / OTH REF: 008

Card 1/1 92

UDC: 546.185

PODKOPAYEV, V.M.; TSVETKOV, Ye.I.

Isolation of a pure culture of *Pseudomonas pyocyanea* and yeasts
from infected material. Lab. delo 10 no.5:306-307 '64.
(MIRA 17:5)

1. Nauchno-kontrol'nyy institut veterinarnykh preparatov Minis-
terstva sel'skogo khozyaystva SSR, Moskva. Nauchnyy rukovoditel'
raboty - V.F.Grezin.

GREZIN, V.F., kand. veter. nauk; PODKOPAYEV, M.V., kand. veter nauk;
KOVALEV, V.F., nauchnyy sotrudnik; TSVETKOV, Ye.I., nauchnyy
sotrudnik

Effectiveness of colimycin and mycerin in gastrointestinal
diseases of calves and piglets. Veterinariia 39 no.11:67-
68 N '62. (MIRA 16:10

1. Gosudarstvennyy nauchno-kontrol'nyy institut veterinarnykh
preparatov.

TSVETKOV, Ye.I.

Production of potato starch in Denmark. Sakh. prom. 33 no.4:65-67
(MIRA 12:6)

Ap '59.

(Denmark--Starch industry)

TSVETKOV, Ye.I.; NOVIKOV, V.V.

Over-all mechanization of the cold-stamping shops. Biul.tekh.-
ekon.inform.Gos.nauch.-issl.inst.nauch.i tekhn.inform. 16 no.6:
24-27 '63. (MIRA 16:8)

(Forging machinery)

POPOV, Ye.M.; TSVETKOV, Ye.N.; CHZHAN ZHUN-YUY [Chang Jung-yü];
MEDVED', T.Ya.

Raman and ultraviolet absorption spectra of some unsaturated
organophosphorus compounds. Zhur.ob.khim. 32 no.10:3255-3260
0 '62. (MIRA 15:11)
(Phosphorus organic compounds--Spectra)

KABACHNIK, M.I.; TSVETKOV, Ye.N.; CHZHAN ZHUN-YUY [Chang Jung-yü]

Orientation of the addition and the reactivity of a vinyl group in the reactions of secondary amines with vinyl compounds of tri- and pentavalent phosphorus. Zhur.ob.khim. 32 no.10:3340-3350 0 '62. (MIRA 15:11)

(Phosphorus organic compounds)

(Amines)

(Vinyl compounds)

KABACHNIK, M.I.; CHZHAN ZHUN-YUY [Chang Jung-yü]; TSVETKOV, Ye.N.

Esters of unsaturated phosphinic acids. Zhur.ob.khim.
32 no.10:3351-3360 0 '62. (MIRA 15:11)

1. Institut elementoorganicheskikh soedineniy AN SSSR.
(Phosphinic acid) (Unsaturated compounds)

TSVETKOV Ye. N.

TSVETKOV Ye. N. - "Developing methods of synthesizing the alkaloid isochanidolendrin".
Moscow, 1955. Min Higher Education USSR. Moscow Inst of Fine Chemical
Technology imeni M. V. Lomonosov, Chair of the Technology of Fine Organic
Compounds. (Dissertation for the Degree of Candidate of Chemical
Sciences.)

S7: Knizhnaya Letopis' No. 46, 12 November 1955. Moscow

Tsvetkov, E. N.

✓ Synthetic studies in the area of magnoline alkaloid.

I. N. Gorbacheva, E. N. Tsvetkov, I. P. Varnakova, A. I.

Gavrilova, and N. A. Prokhorovskii (Inst. Fine Chem.

Acad. Sci. USSR, Moscow) Dokl. Akad. Nauk SSSR, 1963, 142, 1423.

1. Keeping 3-(methoxymethyl)-4'-carboxymethoxy-

methylbiphenyl ether in 25% HBr AcOH 3 days gave 90% 3-

methoxymethyl-4'-carboxymethylbiphenyl ether, m. 107-9° (from

EtOH); with CH_3N_3 this gave the 4'-carboxy-methoxy analog,

m. 107-9° (from EtOH), which refluxed 2 hrs. with NaCN in

MePh gave 70% 3-methoxymethyl-4'-carboxymethylbiphenyl

ether, m. 45-6° (from MeOH); the 4'-carboxy analog, m. 71-2°

(from CCl_4), formed in 73% yield from the Br analog and NaCN. Sapon. with aq. alc. NaOH gave 3,4'-

bis(carboxymethyl)biphenyl ether, m. 102-1°, which treated

with excess SOCl_2 and the resulting crude product treated

with α -(3-methoxy-4-benzyloxyphenyl)ethylamine in CHCl_3

in the presence of 5% KOH gave 65.4% bis[α -(3-methoxy-4-

benzyloxyphenyl)ethyl]amide of 3,4'-biscarboxymethylbiphenyl

ether, m. 125-6° (from EtOH). This (1.15 g) suspended in MePh

and treated with 3 ml. POCl_3 and refluxed 1.5 hrs. gave 2,3'-

bis[α -(3-methoxy-4-benzyloxy-2,4-dihydro-1-isquinolinyl)methyl]biphenyl

ether, isolated as HCl salt, m. 130-42° (from EtOH); *pure*, m. 200-7°. Also in J. Gen.

Chem. U.S.S.R. 23, 1360-71(1955)(Engl. translation).

G. M. K.

(4)

MSI

Tsvetkov, E. N.

Synthesis of substituted diphenyl ethers. I. N. Gorbacheva, E. N. Tsvetkov, L. P. Varnakova, K. M. Loev, and N. A. Predobrazhenskii (Lomonosov Fine Chem. Tech. Inst., Moscow). *Zhur. Obshchei Khim.* 25, 2290-4 (1955).—Slow addn. of 60 ml. Me_2SO_4 and 60 ml. 10N NaOH to 50 g. $m\text{-O}_2\text{NC}_6\text{H}_4\text{CH}_2\text{OH}$ at 40° gave 80% $m\text{-O}_2\text{NC}_6\text{H}_4\text{CH}_2\text{OMe}$, b_p 128–30°, and a residue of $(p\text{-O}_2\text{NC}_6\text{H}_4\text{CH}_2)_2\text{O}$, m. 100–2°. Reduction with Zn–HCl in MeOH gave $m\text{-H}_2\text{NC}_6\text{H}_4\text{CH}_2\text{OMe}$, 80%, b_p 116–18°, d₂₀ 1.067, n_D²⁰ 1.5635; the same forms on hydrogenation of the nitro deriv. over Ni at 65 atm. at room temp. Diazotization in 30% H_2SO_4 with NaNO_2 and heating with much 30% H_2SO_4 gave 60% $m\text{-HOC}_6\text{H}_4\text{CH}_2\text{OMe}$, b_p 119–20°, d₂₀ 1.103, n_D²⁰ 1.5400. Addn. of 13 g. 4,3-Br(O₂N)C₆H₃CO₂H (Ia) to 130 ml. fuming HNO_3 , then heating 1 hr. on a steam bath gave 65% 5-O₂N deriv. (I), m. 162–3°, the same being formed on nitration of $p\text{-BrC}_6\text{H}_4\text{CH}_2\text{CO}_2\text{H}$. Refluxing Ia with EtOH in C_6H_6 in the presence of H_2SO_4 gave 75% Et ester, b_p 150–9°, m. 33–5°. Passage of HCl into I in EtOH at reflux gave 100% its Et ester, m. 75–6°. Heating 0.28 g. KOH, 1.8 ml. H_2O , 1.15 g. 4,3-Br(O₂N)C₆H₃CHO (semicarbazone, m. 221–2°) and 0.62 g. $p\text{-MeOC}_6\text{H}_4\text{OH}$ 3 hrs. at 118–20° gave 63% 3,4-O₂N(4-MeOC₆H₄O)C₆H₃CHO, m. 62–3°; semicarbazone, m. 201–2°. $m\text{-HOC}_6\text{H}_4\text{CH}_2\text{OMe}$ (II) treated with Na in C_6H_6 , followed by 4,3-Br(O₂N)C₆H₃CO₂Me and heating 12 hrs. at reflux gave 77.3% 4,1,3-(3-MeOCH₂C₆H₄O)C₆H₃(NO₂)₂, undistillable yellow oil. II (21 g.) added to 8.5 g. KOH in 25 ml. MeOH, freed of MeOH and treated with 1 g. fresh powd. Cu and $p\text{-BrC}_6\text{H}_4\text{CH}_2\text{CO}_2\text{Me}$ at 140–6° 3.5 hrs. gave 35% 4-(3-MeOCH₂C₆H₄O)C₆H₃CO₂Me, b_p 180–2°, d₂₀ 1.1471, n_D²⁰ 1.5539; the semicarbazone analog, b_p 184–6°, d₂₀ 1.1337, n_D²⁰ 1.5105. Similarly was prepd. 92% 3,4-O₂N(3-MeOCH₂C₆H₄O)C₆H₃CO₂Me, undistillable yellow oil. II Na salt and I gave 90% 3,5,4-(O₂N)₃3-MeOCH₂C₆H₄O)C₆H₃CO₂Me, m. 97–8°. G. M. Kosolapoff

79-12-40/43

AUTHORS: Tsvetkov, Ye. N., Gorbacheva, I. N.,
Preobrazhenskiy, N. A.

TITLE: Methods for the Synthesis of the Alkaloid Isochondodendrine
(Puti sinteza alkaloida Izokhondodendrina).
Cyclo - di - (4 - [3' - (β - aminoethyl) - phenoxy] -
Phenylacetyl (Tsiklo - bis - (4 - [3' - (β - aminoetil) -
fenoksi] - fenilatsetil)).

PERIODICAL: Zhurnal Obshchey Khimii, . 1957, Vol. 27, Nr 12,
pp. 3370-3375 (USSR)

ABSTRACT: Isochondodendrine (I of the given scheme) may be counted
to the macrocyclic di-benzyltetrahydroisoquinoline alkaloids,
which show diversified and interesting physiological
properties. A scheme for the synthesis of this alkaloid and of
its dimethylether (II) is proposed. The basic initial reaction
consists of the intramolecular cyclisation of the amide
(VIII a), which is supposed to lead to the formation of
the macrocyclic diamide (IX a). This substance may then be
transformed into the isochondodendrine (I) or into its dimethyl-
ether (II). An interpretation of the structure of the macro-
cyclic system by means of the intramolecular cyclization
appears to be more appropriate to the authors compared with the

Card 1/2

Methods for the Synthesis of the Alkaloid

79-12-40/43

Isochondodendrine .

Cyclo - di - (4 - [3' - (β -aminoethyl - phenoxy] - phenylacetyl

bimolecular condensations, which were proposed earlier for the synthesis of such compounds. The method proposed here is proved experimentally by the synthesis of the cyclo di - (4(3' - (β -aminoethyl)-phenoxy) - phenylacetyl (IX) (see the complete scheme). On the basis of the cyclization of the diamide (IX) according to Bishler, and of the subsequent hydration two compounds were isolated, which probably possess the formula (X). The existence of two varieties is explained by the two unsymmetric hydrocarbons. There are 6 references, 2 of which are Slavic.

SUBMITTED: November 1, 1956

AVAILABLE: Library of Congress

1. Isochondodendrine - Synthesis
2. Alkaloids - Synthesis

Card 2/2

AUTHORS: Kabachnik, M. I., Corresponding Member
of the AS USSR, Tsvetkov, Ye. N. 20-117-5 25/54

TITLE: A Method for the Synthesis of Alkylphosphinic Esters
(Metod sinteza efirov alkilfosfinistyx kislot)

PERIODICAL: Doklady AN SSSR, 1957, Vol. 117, Nr 5, pp. 817-820 (USSR)

ABSTRACT: These ethers are comparatively not easily accessible substances. A review of their synthesis since 1952 is given and of the usual methods of synthesis with their criticism. The general method of synthesis described here of the ethers alkyl- and aryl phosphinic acids is based upon the effect of magnesium-organic compounds on dialkyl-chlorine-phosphites at -60° $(RO)_2PCl + R'MgX \rightarrow (RO)_2PR' + MgXCl$.

The carrying out of the reaction at low temperature facilitates a selective substitution of the dialkyl-chlorine-phosphites by alkyl- and aryl radicals without touching the alkoxyl groups. The reaction direction is given. Yields, constants, and analytic data of the produced ethers are given in table 1. Bromine derivatives were used as haloid alkyls. Chlorine benzyl and iodine methyl form an exception. The produced ethers succumb in air easily to an oxydation,

Card 1/2

A Method for the Synthesis of Alkylphosphinic Esters

20-117-5-25/54

furthermore they easily iodine copper and sulphur. In order to confirm the structure of the synthesized substances some ethers of the alkylthiophosphinic acids and complex compounds of the arylphosphinic ethers were produced from it with iodine copper by means of the usual methods (table 2). In the ethers of the alkylphosphinic acids the observed molecular refractions were constantly higher by an average of 0,41 than the calculated. For the ethers of the arylphosphinic acids an exaltation of an order of magnitude of 1,20 was found. There are 2 tables, and 14 references, 8 of which are Slavic.

ASSOCIATION: Institute for Elemental-organic Compounds of the AS USSR
(Institut elementoorganicheskikh soedineniy Akademii nauk SSSR)

SUBMITTED: July 20, 1957

Card 2/2

5.3630

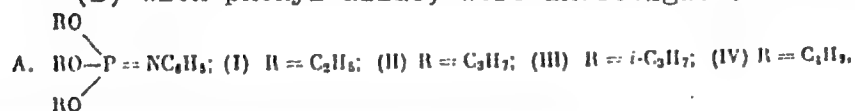
77069
SOV/62-59-12-13/43

AUTHORS: Kabachnik, M. I., Gilyarov, V. A., Tsvetkov, Ye. N.

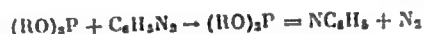
TITLE: Concerning Imides of Phosphorus Acids. Infrared Absorption Spectra of Imidophosphates and Imidophosphonates

PERIODICAL: Izvestiya Akademii nauk SSSR. Otdeleniye khimicheskikh nauk, 1959, Nr 12, pp 2135-2141 (USSR)

ABSTRACT: The IR absorption spectra of trialkyl N-phenylimidophosphates (A) which were obtained previously by reaction of trialkylphosphites (M. I. Kabachnik, V. A. Gilyarov, Izv. AN SSSR. Otd. khim. n. 1956, 790) and dialkyl N-phenylimidoalkyl-(and -aryl) phosphonates (B) with phenyl azide, were investigated:



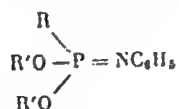
Card 1/12
5



Concerning Imides of Phosphorus Acids.
Infrared Absorption Spectra of Imido-
phosphates and Imidophosphonates

77059

SOV/62-59-12-13/43



(V) R = CH₃; R' = i-C₃H₇

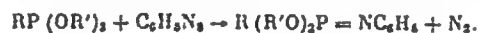
(VI) R = CH₃; R' = C₆H₅

(VII) R = C₂H₅; R' = C₃H₇

(VIII) R = C₃H₇; R' = C₄H₉; (IX) R = C₃H₇; R' = C₆H₅; (X) R = C₄H₉; R' = C₆H₅

(XI) R = C₆H₅; R' = C₂H₅; (XII) R = C₆H₅; R' = C₃H₇

Most of the above compounds were synthesized for the present investigation by the reaction between dialkyl alkyl-(and aryl)-phosphonates and phenyl azide:



IR spectra of the above compounds have a strong absorption band at 1350-1385 cm⁻¹, which indicates the presence of the >P = N-group. The IR spectra of

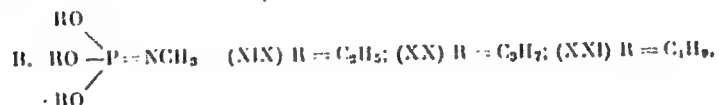
Card 2/10
5

Concerning Imides of Phosphorus Acids.
Infrared Absorption Spectra of Imido-
phosphates and Imidophosphonates

77059

SOV/62-59-12-13/43

triethyl N-acetylimidophosphate (XIII) and trialkyl
N-methylimidophosphates (C) were studied.



The above compounds were obtained by reaction of
methyl azide with trialkyl phosphites.



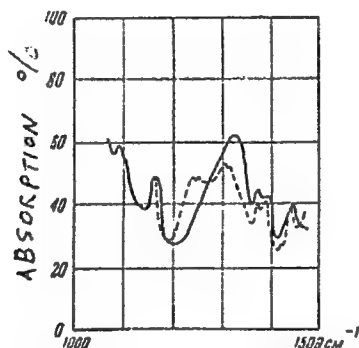
In the IR spectrum of compound XIII, a strong absorp-
tion band at 1350 and 1385 cm^{-1} was observed. Compound
XIX also shows strong absorption at 1325 cm^{-1} . On
exposure to air, its intensity decreases and the

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Concerning Imides of Phosphorus Acids.
Infrared Absorption Spectra of Imido-
phosphates and Imidophosphonates

77069
SOV/62-59-12-13/43

intensity of the band at 1250 cm^{-1} characteristic of
P = O bond increases, thus indicating that the above
compound is easily hydrolyzed.



Card 4/5
5

Concerning Imides of Phosphorus Acids.
Infrared Absorption Spectra of Imido-
phosphates and Imidophosphonates

77069
SOV/62-59-12-13/43

ASSOCIATION: Institute of Element-Organic Compounds, Academy of
Sciences, USSR (Institut elementoorganicheskikh
soedineniy Akademii nauk SSSR)

SUBMITTED: April 18, 1958

5/5
Card 12/12

5.3700

78081

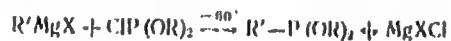
SOV/62-60-1-27/37

AUTHORS: Kabachnik, M. I., Tsvetkov, Ye. N.

TITLE: Brief Communications. Organolithium Compounds in Synthesis of Esters of Alkyl- and Arylphosphonous Acids

PERIODICAL: Izvestiya Akademii nauk SSSR. Otdeleniye khimicheskikh nauk, 1950, Nr 1, pp 133-134 (USSR)

ABSTRACT: M. I. Kabachnik and Ye. N. Tsvetkov (Dokl. AN SSSR 117, 817, 1957) worked out a method for the synthesis of esters of alkyl- and arylphosphonous acids, using organomagnesium compounds. At low temperatures (-60°) alkoxyl groups of dialkylchlorophosphites practically do not react with organomagnesium compounds; a selective replacement of chlorine takes place:



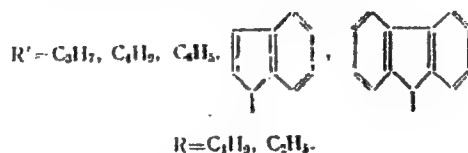
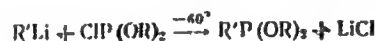
Card 1/3

Brief Communications. Organolithium
Compounds in Synthesis of Esters of
Alkyl- and Arylphosphorous Acids

78031

SOV/62-60-1-27/37

This paper describes the synthesis of the above esters,
using organolithium compounds instead of organomagnesium
compounds:



It was shown that organolithium compounds can be used
for the preparation of the above esters. The yield of
esters obtained using organolithium compounds in some
cases is higher than the yield of esters obtained using
organomagnesium compounds. There are 7 references, 4
U.S., 1 U.K., 2 Soviet. The U.S. and U.K. references

Card 2/3

Brief Communications. Organolithium
Compounds in Synthesis of Esters of
Alkyl- and Arylphosphonous Acids

78031
30V/62-60-1-27/37

are: S. H. Tucker, M. Whalley, J. Chem. Soc. 1949, 50;
H. Gilman, J. A. Beel, C. G. Brannen, M. W. Bullock,
G. E. Dunn, L. S. Miller, J. Am. Chem. Soc. 71, 1499
(1949); N. H. Cromwell, D. B. Capps, J. Am. Chem. Soc.
74, 4448 (1952); P. L. Pauson, G. Wilkinson, J. Am.
Chem. Soc. 76, 2024 (1954); H. Gilman, R. D. Gorsich,
J. Organ. Chem. 23, 550 (1958).

ASSOCIATION: Institute of Element-Organic Compounds, Academy of
Sciences, USSR (Institut elementoorganicheskikh
soyedineniy Akademii nauk SSSR)

SUBMITTED: June 15, 1959

Card 3/3

S/079/60/030/010/011/030
B001/B066

AUTHORS: Kabachnik, M. I. and Tsvetkov, Ye. N.

TITLE: Esters of the Cyclopentadienyl-, Indenyl-1-, and Fluorenyl-9-phosphinic Acids

PERIODICAL: Zhurnal obshchey khimii, 1960, Vol. 30, No. 10, pp. 3227 - 3233

TEXT: The authors were induced by the problem of the tautomerism of trivalent phosphorus compounds to synthesize cyclopentadienyl phosphinic acid esters, to investigate their properties, and to determine their structure. Two structures are possible for these compounds - the covalent one with a trivalent phosphorus atom (I), and the "ylide structure" having an aromatic cyclopentadienyl radical (IV). This structure may be formed as a result of the transition of the proton from the cyclopentadienyl ring to the trivalent phosphorus atom. Tautomeric transformations (I) \rightleftharpoons (IV) were assumed. To find out whether the formation of "ylide structures" is possible, also the corresponding derivatives of indene (V) and fluorene (VI) were investigated. The afore-mentioned compounds

Card 1/3

Esters of the Cyclopentadienyl-, Indenyl-1-, S/079/60/030/010/011/030
and Fluorenyl-9-phosphinic Acids B001/B066

were synthesized by a method described in Refs. 4,5, by substituting different radicals for the chlorine atoms of the dialkyl chloro-phosphites in the reaction with organomagnesium and organolithium compounds at low temperatures. The dibutyl ester of cyclopentadienyl phosphinic acid (VII) was obtained by reacting cyclopentadienyl magnesium bromide with dibutyl chloro-phosphite at -60° . The first investigation results of this compound already suggested the covalent structure, and not the "ylide" structure. The transformations of the above-mentioned ester (VII) (Schemes 1 and 2) confirm the opinion that the resultant phosphinic esters are derivatives of the trivalent phosphorus of covalent structure. The possibility of a tautomeric equilibrium which is shifted toward the covalent types will still have to be considered. This, however, must be proved experimentally. Thus, some chemical properties of cyclopentadienyl-, indenyl-1-, and fluorenyl-9-phosphinic acid esters were investigated; the transformations carried out suggest the presence of a trivalent phosphorus atom in the molecules of these compounds, as well as two double bonds in the ester of cyclopentadienyl phosphinic acid. The authors thank M. Ye. Movsesyan for taking the Raman spectra. ✓

Card 2/3

Esters of the Cyclopentadienyl-, Indenyl-1-, S/079/60/030/010/011/030
and Fluorenyl-9-phosphinic Acids B001/B066

There are 10 references: 6 Soviet, 4 US, and 2 German..

ASSOCIATION: Institut elementoorganicheskikh sovedineniy Akademii
nauk SSSR (Institute of Elemental-organic Compounds of
the Academy of Sciences USSR)

SUBMITTED: November 26, 1959



Card 3/3

TSVETKOV, Ye.N.

Tautomerism. Priroda 49 no.11:22-26 N '60.

(MIRA 13:11)

1. Institut elementoorganicheskikh soyedineniy AN SSSR, Moskva.
(Tautomerism)

5.3630

80087

S/020/60/131/06/29/071
B011/B005

AUTHORS: Kabachnik, M. I., Academician, Tsvetkov, Ye. N., Chzhan Zhun-yuy

TITLE: Esters of Unsaturated Phosphinous Acids

PERIODICAL: Doklady Akademii nauk SSSR, 1960, Vol. 131, No. 6, pp. 1334 - 1337

TEXT: The authors described the synthesis and some transformations of the derivatives of vinyl-, ethinyl-, and p-vinylphenylphosphinous acids. The esters of the acids mentioned in the title have not yet been described in publications; they open the possibility of synthesizing various organophosphorus substances, including polymers. Dibutyl esters of vinyl- and ethinylphosphinous acids (Table 1, I and II) were obtained by the method of Ref. 1 (see Scheme). In a similar way, the butyl ester of secondary vinylphenylphosphinous acid (IV) was synthesized from vinylmagnesium bromide and phenylbutoxychlorophosphine (III). A styrene derivative (V) was produced from p-vinylphenylmagnesium chloride and diethylchlorophosphite. Complex formers - in this case pyridine (according to Ye. L. Geft, Ref. 2) - must be used to extract the esters mentioned in the title. These esters are comparatively resistant to hydrolysis. Therefore, washing with water or sodium-bicarbonate solution can be used to decompose the

Card 1/3

Esters of Unsaturated Phosphinous Acids

80087
S/020/60/131/06/29/071
B011/B005

complex compounds with magnesium halides. The esters produced oxidize easily in the air, but as it seems, less energetically than the corresponding alkylphosphinous esters. The authors confirmed the structure of (I) and (II) by some of their reactions; they are unsaturated derivatives of trivalent phosphorus. Complete esters of phosphinous acids yield corresponding acid esters of these acids by hydrolysis (Ref. 3). In a similar way, the authors obtained easily polymerizable monobutyl esters of these acids (VI) and (VII) by reaction with a theoretical amount of acidified water in dioxane. The trivalence of phosphorus in the ester (I) was confirmed by sulfur addition and Arbuzov's regrouping with methyl iodide. The following products were obtained: dibutyl ester of vinylthiophosphinous acid (VIII), or butyl ester of vinylmethylphosphinous acid (IX), respectively. Polymeric products were mainly obtained in the attempt of carrying out Arbuzov's regrouping of (I) by boiling in excess methyl iodide. Polymerization also occurred in acetonitrile at 0°. The desired result was obtained with the use of petroleum ether but only after 4 hours at 100-110°. (I) being dienophilic enters the reaction of the diene synthesis with cyclopentadiene, and forms the corresponding adduct - the dibutyl ester of bicyclo-(1,2,2)-hepten-2-yl-6-phosphinous acid (X). The latter contains one atom of trivalent phosphorus in the molecule. This was confirmed by sulfur

Card 2/3

Esters of Unsaturated Phosphinous Acids

80087

S/020/60/131/06/29/071
B011/B005

addition. Table 1 shows yields, constants, and analytical data of all compounds produced. There are 1 table and 6 references, 4 of which are Soviet.

ASSOCIATION: Institut elementoorganicheskikh soedineniy Akademii nauk SSSR
(Institute of Elemental-organic Compounds of the Academy of
Sciences, USSR)

SUBMITTED: January 22, 1960

Card 3/3

86394

S.3630

2209

S/020/60/135/002/019/036
B016/B052

AUTHORS: Kabachnik, M. I., Academician, and Tsvetkov, Ye. N.
TITLE: A New Method of Synthesizing Esters of Dialkyl Phosphinous Acids
PERIODICAL: Doklady Akademii nauk SSSR, 1960, Vol. 135, No. 2, pp. 323 - 326

TEXT: The authors report on their attempts to use their method of synthesizing esters of alkyl phosphinous acids from dialkylchloro phosphites (Ref.1) for the synthesis of esters of dialkyl phosphinous acids. The initial substances were the acid chlorides of Menshutkin (not described in the text), alkyl-dichloro phosphites, and the corresponding organo-magnesium compounds. The reaction took place in the presence of pyridine as a form complexing compound and showed satisfactory yields:
$$2R MgX + Cl_2POR' \xrightarrow[60^\circ C]{4C_5H_5N} R_2POR' + 2[MgX Cl \cdot 2C_5H_5N]$$

The yields decrease in the absence of pyridine which probably expels the esters of dialkyl phosphinous acids from complex compounds with magnesium halide.

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3

86394

A New Method of Synthesizing Esters of
Dialkyl Phosphinous Acids

S/020/60/135/002/019/036
B016/B052

8-hydroxyquinoline may also be used as a complexing compound. Mixed with pyridine it sometimes gives higher yields than pure pyridine. All processes were conducted with pure nitrogen. Table 1 gives yields, constants, and analytical data of the substances produced. The method described here showed good results in the production of esters with radicals higher than C_2 on the phosphorus atom. The yield increases with an increasing number of carbon atoms in the radical of the ester group. Esters of dimethyl phosphinous acid could not be obtained. The butyl ester of diphenyl phosphinous acid could only be obtained by reaction with tetrahydrofuran. During the synthesis of the butyl ester of diisopropyl phosphinous acid, $C_{15}H_{25}PON$, a by-product of unknown structure, was isolated. It is possibly an N-phosphorylated derivative of dihydropyrene. By the example of the β -ethyl chloride ester of diethylphosphinous acid, the present method proved to be useful for the production of such esters. Thus, the synthesis of vinylphosphinous oxides (Refs.8,9) has become possible. The properties of diethylphosphinous acid were used by B. A. Arbuzov, N. I. Rizpolozhenskiy (Ref.10), A. I. Razumov, and N. I. Bankovskaya (Ref.11) for studying the

Card 2/5

3

86394

A New Method of Synthesizing Esters of
Dialkyl Phosphinous Acids

S/020/60/135/002/019/036
B016/B052

properties of the esters. The authors studied only some reactions of the substances obtained and showed that they are derivatives of trivalent phosphorus (Table 2). The present article was read at the Second Conference on Chemistry and Application of Organophosphorous Compounds in Kazan' on Nov. 28, 1959. Explanation of Tables 1 and 2: 1: current number; 2: compound; 3: yield; 4: boiling point; 5: n_D^{20} ; 6: d_4^{20} ; 7, 9, 11, 13, and 15: detected; 8, 10, 12, 14, and 16: calculated. There are 2 tables and 15 references: 12 Soviet, 2 US, and 2 German.

ASSOCIATION: Institut elementoorganicheskikh soedineniy Akademii nauk SSSR (Institute of Elemental-organic Compounds of the Academy of Sciences USSR)

SUBMITTED: August 11, 1960

Card 3/0

3

- 86041

53760 2209, 1153, 1236

S/020/60/135/003/025/039
B016/B054

AUTHORS: Kabachnik, M. I., Academician, Chzhan Zhun-yuy. and
Tsvetkov, Ye. N.

TITLE: Method of Synthesizing Tertiary Vinyl Phosphines and Their
Oxides

PERIODICAL: Doklady Akademii nauk SSSR, 1960, Vol. 135, No. 3.
pp. 603 - 605

TEXT: The authors report on their method of synthesizing tertiary mono-vinyl phosphines and their oxides. They proceeded from esters of secondary phosphinous acids (Refs. 6,7). In reactions with organomagnesium compounds in ether or tetrahydrofuran, these esters exchange the alkoxyl groups for corresponding alkyl radicals or for the vinyl radical. Tertiary phosphines are formed: $R R'POR'' + R'''MgX \rightarrow R R'PR''' + R''OMgX$. The easily procurable dibutyl ester of vinyl phosphinous acid (Ref. 7) can be used for the same purpose; but the exchange of the two alkoxyl groups for alkyl radicals does not always take place with satisfactory yields. The authors also synthesized divinyl phenyl phosphine from phenyl-dichloro phosphine

Card 1/2

86041

Method of Synthesizing Tertiary Vinyl
Phosphines and Their Oxides

S/020/60/135/003/025/039
B016/B054

and vinyl magnesium bromide. A 59% yield was attained at low temperatures. Contrary to hitherto obtained data (Ref. 2), divinyl phenyl phosphine is a colorless mobile liquid which is rather stable when stored in nitrogen atmosphere. By the oxidation of vinyl phosphines, the authors produced oxides of tertiary vinyl phosphines. Active manganese oxide in petroleum ether was used at 40°C as an oxidizer which does not affect the double bond. At the initial stage, this reaction had sometimes an exothermic character. The oxidation proceeds without any side reaction. The yields are near the quantitative ones. The oxides of tertiary vinyl phosphines are colorless hygroscopic crystals. There are 2 tables and 10 references: 4 Soviet, 2 US, 1 French, 1 German, and 3 British

ASSOCIATION: Institut elementoorganicheskikh soedineniy Akademii nauk SSSR
(Institute of Elemental-organic Compounds of the Academy of
Sciences USSR)

SUBMITTED: August 11, 1960

Card 2/2

KABACHNIK, M.I.; TSVETKOV, Ye.N.

Dichlorides of p-styrylphosphinous and p-styrylphosphinic acids.
Izv.AN SSSR.Otd.khim.nauk no.10:1896-1897 O '61. (MIRA 14:10)

1. Institut elementoorganicheskikh soedineniy AN SSSR.
(Phosphinous acid) (Phosphinic acid)

89523

S/079/61/031/002/019/019
B118/B208

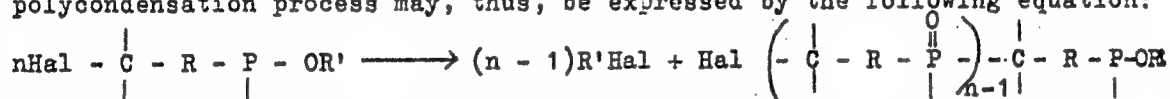
15.8114

AUTHORS: Kabachnik, M. I. and Tsvetkov, Ye. N.

TITLE: Polycondensation according to A. Ye. Arbuzov's reaction

PERIODICAL: Zhurnal obshchey khimii, v. 31, no. 2, 1961, 684-685

TEXT: The regrouping of acid esters of trivalent phosphorus in compounds of pentavalent phosphorus by reaction with halogen derivatives according to Arbuzov (Ref. 1) can be used for the synthesis of organophosphorus polymers. For this purpose, the functions of the acid ester of trivalent phosphorus, and of the alkyl halide, have to be combined in the monomer molecule. The polycondensation process may, thus, be expressed by the following equation:



Such a reaction was first observed by P. A. Rossiyskaya in the isomerization of tri-β-chloro-ethyl phosphite (Ref. 2); but, at that time, the polymeric organophosphorus compounds were regarded as by-products, and their synthesis

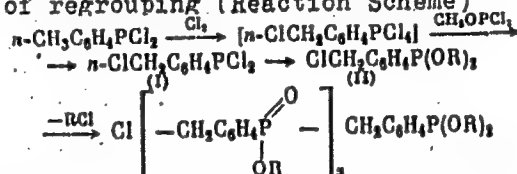
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Polycondensation according ...

was, therefore, not studied. The authors of the present paper synthesized p-chloro-methyl-phenyl-dichloro phosphine (I), the initial product for synthesizing the esters of p-chloro-methyl-phenyl phosphinous acid (II), which form polymers when heated in vacuo between 90° and 120°C, according to Arbuzov's equation of regrouping (Reaction Scheme)



p-Tolyl-dichloro-phosphine in chloro benzene is converted to the corresponding tetrachloride by reaction with chlorine which gave, on further chlorination (in ultraviolet light at 80-90°C), and subsequent reduction with methyl dichloro phosphite (Ref. 3), p-chloro-methyl-phenyl-dichloro phosphine (I). This compound (I) was converted to the di-(β-chloro-ethyl) ester of p-chloro-methyl-phenyl phosphinous acid (II, R = CH₂CH₂Cl) by reaction with ethylene oxide, when heated (90-120°C) for 20 hr in vacuo, the resultant

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ester was transformed into a vitreous, brittle polymer which softened at 15-30°; its molecular weight was 3250. It was soluble in benzene and chloroform from which it was precipitated again with petroleum ether. It contained 13% phosphorus. The diethyl ester of the above acid could also be converted to a polymer under identical conditions (II, R = C₂H₅). There are 3 references: 2 Soviet-bloc and 1 non-Soviet-bloc.

ASSOCIATION: Institut elementorganicheskikh soyedineniye Akademii nauk SSSR
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Sciences USSR)

SUBMITTED: October 5, 1960

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TSVETKOV, YE.N.

Esters of dialkylphosphinous acids.

Khimiya i Primeneniye Fosfororganicheskikh Soedineniy (Chemistry and application of organophosphorus compounds) A. M. A. 1962, ed. Publ. by Kazan Affil. Acad. Sci. USSR, Moscow 1962, 103 p.

Collection of complete papers presented at the 1959 Kazan Conference on Chemistry of Organophosphorus Compounds.

S/079/62/032/010/004/008
D204/D307

AUTHORS: Popov, Ye.M., Tsvetkov, Ye.N., Chang, Jung-Yü, and Medved', T.Ya.

TITLE: Raman and ultraviolet spectra of some unsaturated organic compounds of phosphorus

PERIODICAL: Zhurnal obshchey khimii, v. 32, no. 10, 1962;
3255 - 3260

TEXT: Raman and UV spectra of vinyl compounds of the type $\text{>C} = \text{C} - \text{P} = \text{O}$, $\text{>C} = \text{C} - \text{P} = \text{S}$ and $\text{>C} = \text{C} - \text{P} <$ and of the analogous allyl derivatives were investigated in view of the lack of publications concerned with the spectra of these systems. The Raman spectra were taken on an ИСП-51 (ISP-51) spectrograph, the line intensities being measured photoelectrically with an accuracy of $\pm 15\%$. The UV spectra were investigated on an СП-41 (SP-41) spectrophotometer. The compounds were tested in a solution of heptane. The characteristic vibrations of the $\text{C} = \text{C}$ bonds in the allyl compounds were very similar to those of $\text{C} = \text{C}$ in alkenes possessing a termi-
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nal = CH_2 group, and the UV spectra of $\text{CH}_2 = \text{CH} - \text{C}_4\text{H}_9$ and $\text{CH}_2 = \text{CH} - \text{CH}_2 - (\text{O})\text{P}(\text{OC}_4\text{H}_9)_2$ were practically the same, indicating that in these compounds there is practically no interaction between the C = C bonds and the P = O, P = S or the trivalent P atom separated from the double bond by a methylene group. In the vinyl derivatives, the C = C Raman line intensities were generally lowered and the UV absorption bands were slightly shifted towards the shorter wavelengths, in comparison with hexene-1. No indication of conjugation in these systems was thus obtained. The assistance of M.I. Kabachnik P.P. Shorygin and V.A. Petukhov is acknowledged. There are 3 tables.

SUBMITTED: July 10, 1961

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S/079/62/032/010/005/008
D204/D307

AUTHORS: Kabachnik, M.I., Tsvetkov, Ye.N., and Chang, Jung-Yu

TITLE: Reactivity of the vinyl group and the direction of addition in the reactions of secondary amines with the vinyl compounds of tri- and pentavalent phosphorus

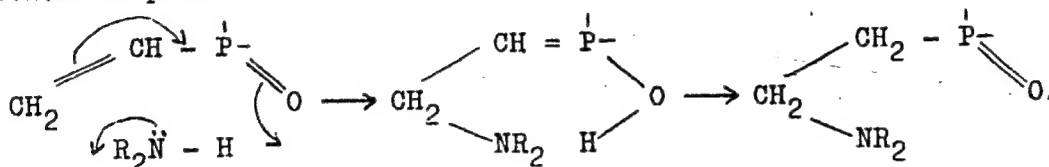
PERIODICAL: Zhurnal obshchey khimii, v. 32, no. 10, 1962;
3340 - 3350

TEXT: The addition reactions of piperidine and diethylamine to $\text{CH}_2 = \text{CH} - \text{P}(\text{C}_4\text{H}_9)_2$ (I), $\text{CH}_2 = \text{CH} - \text{P}(\text{OC}_4\text{H}_9)_2$ (II), $\text{CH}_2 = \text{CH} - \text{P}(\text{O}) \cdot \text{H} \cdot \text{OC}_4\text{H}_9$ (III), $\text{CH}_2 = \text{CH} - \text{P}(\text{O})(\text{C}_4\text{H}_9)_2$ (IV) and $\text{CH}_2 = \text{CH} - \text{P}(\text{O}) \cdot \text{CH}_3 \cdot \text{C}_4\text{H}_9$ (VI) were studied in an effort to clarify the influence of the P-containing groups on the double bond of the vinyl group. The readiness with which the vinyl compounds reacted with the amines was in the order $\text{III} > \text{VI} > \text{IV} > \text{II} > \text{I}$; thus III reacted exothermically when mixed with pyridine in the presence of hydroquinone, whilst I required heating to $145 - 160^\circ\text{C}$ in a sealed tube, for 19 hrs., in Card 1/3

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the presence of a catalyst. It was shown that the addition followed Markovnikov's rule in all cases, i.e. the N-atom of piperidine bonded on to the β -carbon of the vinyl group. In pentavalent P compounds the observed direction of addition is ascribed to $R_2NH + CH_2 = CH - \overset{\overset{|}{P}}{=} O \rightarrow R_2NCH_2CH_2 - \overset{\overset{|}{P}}{=} O$, or the formation of a cyclic transition complex:



For the β -addition of secondary amines to trivalent P compounds, the following possibilities are presented: (a) polarization of the C = C bond by a weak inductive effect directed towards the phosphorus: $CH_2 = \overset{\overset{|}{P}}{CH} \rightarrow \overset{\overset{|}{P}}{CH} <$, (b) in the case of I, which only reacts in the presence of piperidine hydrochloride, the formation of a salt, Card 2/3

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$\text{CH}_2 = \text{CH} \overset{+}{\text{P}} \text{H} \text{Bu}_2 \text{Cl}^-$, in which a strong inductive effect may give rise to $\text{CH}_2 = \text{CH} \rightarrow \ddot{\text{P}} <$, and (c) participation of the vacant 3d-orbitals of phosphorus in the conjugation, to give $\text{CH}_2 = \text{CH} \text{---} \ddot{\text{P}} <$.

SUBMITTED: July 28, 1961

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